QUALITY ASSURANCE SAMPLING PLAN

FOR
CLUTE MERCURY
(b) (6)
CLUTE, BRAZORIA COUNTY, TEXAS

Prepared For

U.S. Environmental Protection Agency Region 6
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1. INTRODUCTION

Weston Solutions, Inc. (WESTON®), the Superfund Technical Assessment and Response Team (START-3) contractor, has been tasked by the U.S. Environmental Protection Agency Region 6 (EPA Region 6) and Prevention and Response Branch (PRB) under Contract Number EP-W-06-042, Technical Direction Document (TDD) Number TO-0001-08-07-01, to perform a Tier 2 emergency response to determine the sources of mercury within a residential home. As a result of the findings during the emergency response, START-3 has been tasked to conduct removal assessment sampling activities at the Clute Mercury site. The site is located at (b) (6) in Clute, Brazoria County, Texas. START-3 has prepared this Quality Assurance Sampling Plan (QASP) to describe the technical scope of work to be completed at the site as part of the removal assessment.

1.1 PROJECT OBJECTIVES

START-3 is providing technical assistance to EPA Region 6 by collecting air samples to support the EPA determination that the site no longer presents a threat to public health or welfare of the United States or the environment in accordance with *40 Code of Federal Regulations (CFR) 300.415*.

The primary objective of the removal assessment is to confirm the removal of site-related contamination. The inorganic contaminant-of-concern (COC) is mercury. The objectives of the assessment will be achieved by evaluating data obtained during the field activities through the collection of air samples from selected on-site locations.

Air samples will be collected from areas inside a residential house and across the street from the residential property to determine if mercury contamination exists above the Agency for Toxic Substances and Disease Registry (ATSDR) residential occupancy level (level acceptable for occupancy of any structure after a spill) of 1 microgram per cubic meter ($\mu g/m^3$) utilizing the National Institute for Occupational Safety and Health (NIOSH) Analytical Method 6009.

1.2 PROJECT TEAM

The Project Team will consist of Jeff Criner as the START-3 Assessment/Inspection Manager; Jeff McCully as the START-3 Project Team Leader (PTL); and the Field Safety Officer (FSO). The PTL will be responsible for the technical quality of work performed in the field and will serve as the START-3 liaison to EPA Region 6 in the field during the site activities. The PTL, with the concurrence of the EPA OSC, will determine the locations for sample collection in the field, in collecting samples as necessary, in logging the activities at each sample location in the field logbook, and in verifying the sample documentation. The PTL acting as the Data Manager will be responsible for accurate chain-of-custody documentation for the samples collected during field activities. The Data Manager will oversee the packaging and shipping of samples to the designated laboratory, including the entry of daily sample collection into SCRIBE and observational data into Response Manager. The START-3 FSO will be responsible for providing overall site health and safety support.

1.3 QASP FORMAT

This QASP has been organized in a format that is intended to facilitate and effectively meet the objective of the removal assessment. The QASP is organized as follows:

- Section 1 – Introduction
- Section 2 – Site Background
- Section 3 – Sampling Approach and Procedures
- Section 4 – Analytical Approach
- Section 5 – Data Validation
- Section 6 – Quality Assurance

All figures are provided as portable document format (pdf) files. Appendices are provided with the following information:

- Appendix A Site-Specific Data Quality Objectives (DQOs) Table
- Appendix B WESTON Standard Operating Procedures (SOPs)
- Appendix C NIOSH Analytical Method 6009
- Appendix D Copy of START-3 TDD TO-0001-08-07-01

2. SITE BACKGROUND

Information regarding the site location, description, and history is included in the following subsections.

2.1 SITE LOCATION AND DESCRIPTION

The residential mercury spill site is located inside a house on (b) (6) in Clute, Brazoria County, Texas. The site is a private residence, which is located within a residential neighborhood, and occupied by one adult and occasionally by one child. The residence is approximately 1,300 square feet in area. The site is located within the boundaries of the town of Clute and is referenced in the Freeport Quadrangle, U.S. Geological Survey (USGS) 7.5-minute quadrangle (Figure 2-1).

2.2 SITE HISTORY

On 28 June 2008, local authorities reported to the National Response Center (NRC No. 875602) that 3 private residences had been contaminated with approximately 6 pounds of mercury. A young boy found the mercury contained in a jar and played with it at his house (b) (6) (b) (6) and 2 additional houses. On 19 June 2008, local emergency response teams responded to 2 of the houses, removed elemental mercury and contaminated items and declared them remediated. The local teams responded to (b) (6) and removed a section of carpet from the front bedroom; however, operations were suspended due to lack of funding.

On 3 July 2008, EPA mobilized its START-3 contractors to (b) (6) (the incident location) to assess the situation and perform analytical screening of the source-house for mercury vapor. The occupants of the house were relocated to the homes of relatives. START-3 conducted air monitoring with a RA-915+ Lumex Mercury Analyzer which is equipment capable of monitoring levels of mercury vapors in nanograms per cubic meter (ng/m^3). Initial readings outside the front door of the residence were 9,105 ng/m^3 at a height of 4 feet (breathing level) and > 25,000 ng/m^3 at a height of 1 foot. Just inside the front door the readings were 41,000 ng/m^3 at a height of and >84,000 ng/m^3 at a height of 1 foot. At the back door the readings were > 50,000 ng/m^3 at a height of 4 feet. Having confirmed the presence of mercury, and transferring

the information to local officials, START-3 was released from the site by OSC Steve Mason. After consulting with EPA, Local representatives vented the house for 3 days than sealed the house for an additional day.

On 8 July 2008, EPA OSC Robert Bernier mobilized START-3 and Emergency Response Removal Services (ERRS) contractors to perform an emergency response removal of elemental mercury from the incident location. At 1300 hours on 8 July 2008, EPA OSC Roberto Bernier and START-3 and ERRS contractors arrived at the site location to begin cleanup and removal procedures. START-3 screened the front and back yards of the residence to determine the placement of a decontamination station and staging areas for personal effects. No mercury vapor concentrations were detected above the EPA action level of 100 micrograms per cubic meter ($\mu g/m^3$).

On 9 July 2008, EPA representatives screened the inside of the residence prior to venting the house. Mercury vapor concentrations throughout the house ranged from 3,612 ng/m^3 (Living Room) to 15,700 ng/m^3 (Bedroom 1) at a height of 4 feet and from 2,412 ng/m^3 (Living Room) to 16,000 ng/m^3 (Bedroom 1) at a height of 0 to 3 inches. While venting the house, ERRS placed personal affects from Bedroom 1 into poly bags and removed them to a staging area located outside the house for analytical screening. ERRS contractors delivered two connex boxes to the site for storage of personal affects determined to exhibit mercury vapor concentrations below the EPA action level of 10 $\mu g/m^3$.

As of 11 July 2008, START-3 continues using the Lumex Mercury Analyzer to conduct indoor air screening and screening of personal items. The ERRS Contractors continue with the segregating, bagging, venting, vacuuming, binding, and removal of contaminated effects exhibiting elevated concentrations of mercury vapor to staging areas outside for analytical screening. These activities will continue until all personal items have been screened and those items greater than 10 $\mu g/m^3$ are properly disposed of and until indoor screening shows that indoor vapor concentrations are below the ATSDR residential occupancy level (level acceptable for occupancy of any structure after a spill) of 1 $\mu g/m^3$. Once these levels are reached,

confirmation sampling inside of the residence will take place using (NIOSH) Analytical Method 6009.

3. SAMPLING APPROACH AND PROCEDURES

The specific field investigation activities that will be conducted during site sampling are presented in the following subsections. Sampling procedures and sample locations are also included.

3.1 OVERVIEW OF SAMPLING ACTIVITIES

EPA OSC Roberto Bernier and START-3 will determine appropriate sample locations within the residence. Sampling will be conducted at the breathing air level ranging from 3 to 4 feet.

A subcontracted laboratory that meets NIOSH criteria will be utilized for all analytical testing unless otherwise directed by EPA OSC Bernier. The analytical results will be used for a quantitative determination of the presence of mercury in the residence.

3.1.1 Data Quality Objectives

The objective of the sampling activities described in this QASP is to confirm the removal of mercury from the air within the residence. To accomplish this, the following data quality objective (DQO) has been established and is included in Appendix A:

- Confirm the removal of mercury vapors within the residential property.

This DQO was developed using the seven-step process set out in the *EPA Guidance for Quality Assurance Project Plans: EPA QA/G-5*.

3.1.2 Health and Safety Plan Implementation

The START-3 field activities will be conducted in accordance with the site-specific health and safety plan (HASP). The START-3 FSO will be responsible for implementation of the HASP during all field investigation activities. In accordance with the WESTON's general health and safety operating procedures, the field team will also drive the route to the hospital specified in the HASP prior to initiating sampling activities.

3.1.3 Community Relations

Community relations will not be required during air sampling. The PTL will be at the site for a short period of time to set up and remove air samplers. If any questions from the community are asked while the PTL is on-site, they will be directed to EPA OSC Eric Delgado.

3.2 SAMPLING/MONITORING APPROACH

Mercury vapor sampling will be conducted in general accordance with the procedures set forth in NIOSH Analytical Method 6009. A sample collection and analyses summary table is presented as Table 3-1.

3.2.1 Sampling

START-3 proposes to collect up to seven mercury vapor samples (including one field duplicate and one background sample) for laboratory analyses from various locations within and around the affected residential home. The proposed sample locations currently planned are one in each of the bedrooms, one between the bathroom and the hallway, one between the kitchen and laundry room, one in the living room, and one in the den of the residential property. One background sample will be collected from approximately 100 yards northwest of the residence, and one sample will be a duplicate sample. Proposed sample locations are illustrated in Figure 3-1. Actual sample locations will be finalized in the field and will be determined by the EPA OSC before START-3 arrives at the site.

The collected mercury vapor samples will be delivered to Aerotech Environmental Laboratories, located in Phoenix, Arizona for mercury analysis, utilizing NIOSH Analytical Method 6009. All relevant observations and information will be recorded in the field logbook, SCRIBE, and removal modules of Response Manager software.

3.2.2 Investigation-Derived Waste (IDW)

It is not anticipated that IDW will be generated during air sampling activities because the mercury vapor concentration within the residences is below the personnel exposure limit (PEL) requiring upgraded safety measures. If IDW is generated from used personal protective equipment (PPE), it

will be placed in plastic bags and disposed by ERRS at a permitted disposal facility.

3.2.3 Sampling and Sample Handling Procedures

Samples will be collected using equipment and procedures appropriate to the matrix, parameters, and sampling objectives. The volumes of the samples collected must be sufficient to perform the analyses requested. Samples must be stored in the proper types of containers and preserved in a manner that is appropriate for the analyses to be performed.

All clean, decontaminated sampling equipment and sample containers will be maintained in a clean, segregated area. All samples will be collected with clean, decontaminated equipment. All samples for laboratory analysis will be collected in solid sorbent tubes and placed in individually designated Ziploc® bags. Sampling personnel will change gloves between each sample collection/handling. All samples will be assembled and catalogued prior to shipping to the designated laboratory.

3.2.4 Quality Assurance/Quality Control Samples

START-3 will collect one blind duplicate and one field duplicate samples for quality assurance/quality control (QA/QC) purposes:

3.3 SAMPLE MANAGEMENT

Specific nomenclature that will be used by START-3 will provide a consistent means of facilitating the sampling and overall data management for the project as defined in the WESTON Standard Operating Procedures (SOPs) provided in Appendix B. Any deviations from the sample nomenclature proposed below must be approved by the START-3 PTL. The general nomenclature consists of the following components:

- Geographic location or on-site sample location
- QA/QC type (normal, duplicate, rinsate blank, etc.)
- Sequence (e.g., which sample it represents)

Sample locations will be identified in the field, as each location is sampled, independent of the physical location of the sample.

3.4 SAMPLE PRESERVATION, CONTAINERS, AND HOLD TIMES

Once collected, samples will be placed into plastic bags and maintained on-site until they are submitted for laboratory analysis. No preservation of the samples is necessary. The samples will be sent to the designated laboratory by overnight carrier.

The hold time is initiated when the samples are collected in the field and continues until the analysis is begun. The turnaround time is initiated when the samples are received by the laboratory and continues until the analytical results made available to WESTON either verbally, electronically, or by providing facsimile copies of the results for review. Samples that have been analyzed will be disposed by the designated laboratory in accordance with the laboratory SOPs.

Table 3-1
Sample Collection and Analysis Summary
Clute Mercury
Clute, Brazoria County, Texas

Sample Location	Sample Collection Method	No. of Samples	Rationale	NIOSH Analytical Method
Residential Home	NIOSH Analytical Method 6009 (Appendix C)	5	Determine mercury vapor concentration	6009
		1	QA/QC Duplicate	
		1	Background	

4. ANALYTICAL APPROACH

Samples collected by START-3 during the confirmation sampling will analyzed by Aerotech Laboratories, Inc, located in Phoenix, Arizona utilizing NIOSH Analytical Method 6009 (Appendix C).

5. DATA VALIDATION

START-3 will validate the analytical data generated by the subcontracted laboratory using modified EPA-approved data validation procedures in accordance with the EPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004). A summary of the data validation findings will be presented in Data Validation Summary Reports as part of the final report. START-3 will evaluate the following (if applicable) to verify that the analytical data is within acceptable QA/QC tolerances:

- The completeness of the Laboratory Reports, verifying that all required components of the report are present and that the samples indicated on the accompanying chain-of-custody are addressed in the report.
- The calibration and tuning records for the laboratory instruments used for the sample analyses.
- The results of internal standards analyses.
- The results of laboratory blank analyses.
- The results of laboratory control sample (LCS) analyses.
- The results of surrogate recovery analyses.
- Compound identification and quantification accuracy.
- Laboratory precision by reviewing the results for blind field duplicates.

Variances from the QA/QC objectives will be addressed as part of the Data Validation Summary Reports.

6. QUALITY ASSURANCE

Quality Assurance (QA) will be conducted in accordance with the WESTON Corporate Quality Management Manual, dated March 2004; the WESTON START-3 Quality Management Plan, dated June 2007; and EPA Quality Assurance/Quality Control Guidance for Removal Activities, dated April 1990. Following receipt of the Technical Direction Document (TDD) (Appendix D) from EPA, a Quality Control (QC) officer will be assigned and will monitor work conducted throughout the entire project including reviewing interim report deliverables and field audits. The START-3 PTL will be responsible for QA/QC of the field investigation activities. The designated laboratory utilized during the investigation will be responsible for QA/QC related to the analytical work. START-3 will also collect samples to verify that laboratory QA/QC is consistent with the required standards and to validate the laboratory data received.

6.1 SAMPLE CUSTODY PROCEDURES

Because of the evidentiary nature of sample collection, the possession of samples must be traceable from the time the samples are collected until they are introduced as evidence in legal proceedings. After sample collection and identification, samples will be maintained under the chain-of-custody procedures. If the sample collected is to be split (laboratory QC), the sample will be allocated into similar sample containers. Sample labels completed with the same information as that on the original sample container will be attached to each of the split samples. All personnel required to package and ship coolers containing potentially hazardous material will be trained accordingly.

START-3 personnel will complete chain-of-custody forms using the Scribe Environmental Sampling Data Management System (SCRIBE) for all samples sent to a START-3 designated off-site laboratory. The chain-of-custody procedures are documented and will be made available to all personnel involved with the sampling. A typical chain-of-custody record will be completed each time a sample or group of samples is prepared for shipment to the laboratory. The record will repeat the information on each sample label and will serve as documentation of handling during shipment. A copy of this record will remain with the shipped samples at all times, and

another copy will be retained by the member of the sampling team who originally relinquished the samples.

Samples relinquished to the participating laboratories will be subject to the following procedures for transfer of custody and shipment:

- Samples will be accompanied by the chain-of-custody record. When transferring possession of samples, the individuals relinquishing and receiving the samples will sign, date, and note the time of the sample transfer on the record. This custody record documents transfer of sample custody from the sampler to another person or to the laboratory.

- Samples will be properly packed for shipment and dispatched to the appropriate laboratory for analysis with separate, signed custody records enclosed in each sample box or cooler. Sample shipping containers will be custody-sealed for shipment to the laboratory. The preferred procedure includes use of a custody seal wrapped across filament tape that is wrapped around the package at least twice. The custody seal will then be folded over and attached to the seal to ensure that the only access to the package is by cutting the filament tape or breaking the seal to unwrap the tape.

- If sent by common carrier, a bill of lading or air bill will be used. Bill of lading and air bill receipts will be retained in the project file as part of the permanent documentation of sample shipping and transfer.

6.2 PROJECT DOCUMENTATION

All documents will be completed legibly and in ink and by entry into field logbooks, Response Manager, and SCRIBE. Response Manager is the Enterprise Data Collection System designed to provide near real-time access to non-analytical data normally collected in logbooks. Response Manager provides a standard data collection interface for modules of data normally collected by START-3 field personnel while on-site. These modules fall into two basic categories for Response and Removal. The modules include Emergency Response, Reconnaissance, Facility Assessment, Shipping, Containers, Materials, Calls, HHW, and General/Site Specific data. The system provides user's with a standard template for laptop/desktop/tablet PCs that will synchronize to the secure web interface using merge replication technology to provide access to field collected data via on the RRC-EDMS EPA Web Hub. Response Manager also includes a PDA application that provides some of the standard data entry templates from Response

Manager to user's on for field data entry. Response Manager also includes an integrated GPS unit with the secure PDA application, and the coordinates collected in Response Manager are automatically mapped on the RRC-EDMS interactive mapping site. GIS personnel can then access this data to provide comprehensive site maps for decision-making support.

Response Manager also includes an Analytical Module that is designed to give Scribe users the ability to synchronize the SCRIBE field data to the RRC-EDMS Web Hub. This allows analytical data managers and data validators access to data to perform reviews from anywhere with an Internet connection. The Analytical Module is designed to take the analytical data entered into EPA SCRIBE software and make it available for multiple users to access on one site. START-3 personnel will utilize SCRIBE for all data entry on-site and will upload to the Response Manager Analytical module.

6.2.1 Field Documentation

The following field documentation will be maintained:

Field Logbook

The field logbook is a descriptive notebook detailing site activities and observations so that an accurate, factual account of field procedures may be reconstructed. All entries will be signed by the individuals making them. Entries should include, at a minimum, the following:

- Site name and project number
- Names of personnel on-site
- Dates and times of all entries
- Description of all site activities, including site entry and exit times
- Noteworthy events and discussions
- Weather conditions
- Site observations
- Identification and description of samples and locations
- Subcontractor information and names of on-site personnel
- Dates and times of sample collections and chain-of-custody information

- Records of photographs
- Site sketches

Sample Labels

Sample labels will be securely affixed to the sample container. The labels will clearly identify the particular sample and include the following information:

- Site name and project number
- Date and time the sample was collected
- Sample preservation method
- Analysis requested
- Sampling location

Chain-of-Custody Record

A chain-of-custody will be maintained from the time of sample collection until final deposition. Every transfer of custody will be noted and signed for and a copy of the record will be kept by each individual who has signed it. The chain-of-custody is discussed in Subsection 6.1 Sample Custody Procedures.

Custody Seal

Custody seals demonstrate that a sample container has not been tampered with or opened. The individual who has custody of the samples will sign and date the seal and affix it to the container in such a manner that it cannot be opened without breaking the seal.

Photographic Documentation

START-3 will take photographs to document site conditions and activities as site work progresses. Initial conditions should be well documented by photographing features that define the site-related contamination or special working conditions. Representative photographs should be taken of each type of site activity. The photographs should show typical operations and

operating conditions as well as special situations and conditions that may arise during site activities. Site final conditions should also be documented as a record of how the site appeared at completion of the work.

All photographs should be taken with either a film camera or digital camera capable of recording the date on the image. Each photograph will be recorded in the logbook and within Response Manager with the location of the photographer, direction the photograph was taken, the subject of the photograph, and its significance (i.e., why the picture was taken). Where appropriate, the photograph location, direction, and subject will also be shown on a site sketch and recorded within Response Manager.

6.2.2 Report Preparation

At the completion of the project, START-3 will review and validate all laboratory data and prepare a draft report of field activities and analytical results for EPA OSC review. Draft deliverable documents will be uploaded to the EPA TeamLink website for EPA OSC review and comment.

6.2.3 Response Manager

START-3 will use the Response Manager module located on the EPA Web Hub, https://solutions.westonproject.net/epawebhub/, to collect and organize the data collected from project activities. The information to be included encompasses some or all of the following depending on the specific project needs:

- General Module – Site specific data including location and type of site. It also includes an area for all key site locations including geo-spatial data associated with the key site locations.

- Emergency Response Module – includes the following sub-modules: Basic Info, HAZMAT, Release, Time line log, Incident Zones, Photos, Sensitive Receptors, Evacuations, Source, Cause, and Weather.

- Reconnaissance Module – provides standard templates with the flexibility of adding any additional question's of values to the drop down lists for targeted reconnaissance efforts. Typically the data in this module is associated with ESF-10 deployments and the clean-

up of orphaned containers and hazardous debris, but the module can be utilized for any an all reconnaissance activities.

- Facility Assessment Module - provides standard templates with the flexibility of adding any additional questions of values to the drop down lists for assessments of structures. Typically utilized for EPA regulated program facilities during an ESF-10 deployment of resources. This module can be utilized to track the assessment of any facilities including multiple assessments of the fixed facilities.

- Shipping Module – provides standard templates for creating a cradle to grave record of all waste shipments from the site until they are recycled or destroyed. This includes the ability to capture manifest and manifest line items, and upload photos/original documents to support the records.

- Container Module – provides standard templates for cataloguing containers including HAZCAT and Layer information in each container. The module also allows for the tracking of which containers are bulked.

- Properties Module – provides standard templates with the flexibility of adding any additional question's of values to the drop down lists for collection of property data including access agreements and assessments of the property and current status of property with regards to the site removal action.

- Materials Module – provides standard templates for tracking materials that are brought on-site or that are removed from the site.

- Daily Reports – provides standard templates for tracking daily site activities, daily site personnel, and daily site notes for reporting back to the OSC in a POLREP or SITREP.

- HHW Module - provides standard templates with the flexibility of adding any additional question's of values to the drop down lists for tracking the amount of HHW collected at individual collection stations by HHW type.

- Data Files – data files can be uploaded in the photo module section and be associated with individual records or with the site in general. The meta data associated with that data file can be filled in using the photo log fields.

The data stored in the Response Manager database can be viewed and edited by any individual with access rights to those functions. At anytime deemed necessary, POLREP and/or SITREP's can be generated by exporting the data out of Response Manager into Microsoft Excel/Word. The database is stored on a secure server and backed up regularly.